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FOOD DIGEST

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NATIONAL INFORMATION CENTRE FOR FOOD SCIENCE & TECHNOLOGY
AT
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MYSORE 570 013, INDIA

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STORAGE

1 Estimate of losses to foodgrains during post-harvest handling, processing and storage

Stage where the loss ic caused	Estimated loss in thousand tonnes	Estimated loss expressed as %
Threshing yard	1,317,708	1.68
Transport	117,478	0.15
Processing	748,913	0.92
Storage:		
i) Rodents	1,957,940	2.50
ii) Birds	668,105	0.85
iii) Insects	1,992,116	2.55
iv) Moisture	534,114	0.68
Estimated total loss	7,386,424	9.33

For these estimates loss is worked out on the basis of food value only. Drying which causes loss in weight but not loss in food value, spillage, loss in weight on account of theft, loss on account of conversion where some quantity may be lost for human consumption but is available for animal consumption, are not considered as loss. (Tropical Stored Products Information. 36; 1978; 28)

2 Preservation of oilseeds by infiltration under vacuum

A method to extend the storage life of walnuts salted groundnuts, etc. for upto one year at room temperature is described. It involves the infiltration of the products under vacuum with molten fat

treated with antioxidants. Oxidation of the lipids in the oil seeds is prevented by the infiltrating fat which blocks the air channels. The technique can be applied under normal factory conditions as a batch or continuous process, and material treated by this method is suitable for all traditional applications. (Food Manufacture. 53(8); 1978; 61)

FOOD ADDITIVES

3 New additive that keeps fish fresh

An additive (BL-7) was developed earlier in Japan that keeps crustacea, such as lobsters, fresh by preventing their surfaces from turning black. Now a freshness-preservation agent (BL-F) for use on ordinary fish has been developed. Tests have proved that the additive is very effective on fish, such as mackerel, mackerel pike and horse mackerel.

Based on tryptophan as the principal ingredient, BL-F, besides preventing the decomposition of the protein in fish (by activating the enzymes in the fish tissues), is credited with long lasting effects in the prevention of the growth of mold, sterilization, prevention of acidification of oils and fats, preservation of fish color, etc.

The additive is administered in a simple manner; fish are immersed for 5-10 sec in a 0.3-0.5% BL-F seawater or fresh water solution. They are then kept on ice, put in cold storage or frozen for storage. (Research and Industry. 23(2); 1978; 106-7)

4 Mono ammonium glycyrrizin

Mono ammonium glycyrrizin (MAG) is 50 times sweeter than sucrose. But the relative sweetness is difficult to assess because of the

accompanying licorice flavors. Its sweetness is equivalent to fully ammoniated glycyrrizin and is essential where color and pH sensitivity are important factors. In some products, MAG can be an effective replacement for saccharin at one to three times the original saccharin concentration. Suggested applications include beverages, syrups, low calorie preparations, chocolate and cocoa preparations, meats and animal and pet foods. (Processed Prepared Food. 147(8); 1978; 94)

5 Surfactants in peanut butter

Surfactants perform a crystallization function in peanut butter. In peanut butter, which contains about 50 per cent peanut oil, the oil tends to separate during storage. Separation can be prevented by entrapping free peanut oil in the crystallized surfactant. Atmul 124 at 1.0 to 2.5 per cent has proven its ability to overcome oil separation. (Processed Prepared Food. 147(8); 1978; 88)

6 Food grade conditioning

The high porosity of syloid silica conditioning agents enables to absorb upto three times their own weight of many liquids. This is particularly useful in producing a traditionally liquid product such as a flavor, oil or other ingredient in a powdered form. The powders can be handled more easily and can be measured and blended more accurately and efficiently. In certain convenience foods, the additive (flavour, colour, oil) is safely trapped inside the Syloid silica pores until the food is mixed with water. Because the Syloid silica has greater affinity for water than any other liquid, water displaces the entrapped additive releasing them for use at precisely the right time. (Processed Prepared Food. 147(8); 1978; 70)

7 Tomato flavor extenders

Tomato flavors and extenders can replace both the solids and

the flavor of tomatoes and tomato pulp and powder at levels of upto 50 per cent of the natural pulp or powder and 100 per cent of the flavor. The extenders contain starch, milk solids and dextrose, that when dispersed in water thicken very similarly to natural tomatoes.

The pulp and powder extender products and flavors can be used in both the instant and cooked foods including liquid or dry soups and sauces, pre-cooked entrees, salad dressings, snack foods, blended seasonings, tomato drinks and any other products made with tomatoes, tomato pulp or tomato powder. (Processed Prepared Food. 147(8); 1978; 72)

8 Cocoa powder replacers

A specially formulated, low-cost cocoa powder replacer has been developed. Nocoa is an equal strength, heat-stable pound-for-pound alternative to cocoa powder. This product was designed to replace upto 50 per cent of the cocoa in most foods and beverages. Containing natural and artificial flavors, Nocoa provides aroma, color, texture, mouthfeel and bulk. Besides the cost savings there is good flexibility in the formulation of Nocoa that allows for alternations to compensate for the variance in the flavor and taste characteristics in cocoa powders. (Processed Prepared Food. 147(8); 1978; 79)

9 Cocoa substitute from brewer's yeast contains no chocolate

A product that smells and tastes like cocoa but contains no chocolate is under test marketing. The replacement product is made from special brewer's yeast and could eliminate dependence on imported cocoa beans for drinks, candies, coatings and baked goods. (Food in Canada. 38(6); 1978; 41)

10 Reduction of nitrite and nitrate addition to meat products

Possible ways of reducing the quantities of nitrite and nitrate added to meat products were considered in view of the danger of carcino-

genic N-nitroso compounds being produced. The extent to which these curing substances are converted is largely determined by the thermal treatment and by enzymatic and bacteriological processes during manufacture and storage. Additives with reducing properties or with properties which lower the pH value cause a reduction in the residual nitrite content but this is associated with an increase in the residual nitrate content. Compounds with activated methylene groups such as sorbic acid can react with nitrite, forming very strong bacteria-inhibiting substances. When using additives of this kind, it seems possible to achieve the required bacteriological stability of meat products with very small quantities of nitrite. However, before such methods are permissible, the nitrite reaction products must be thoroughly tested to ensure that they are harmless to health. (Food Manufacture. 53(7); 1978; 23)

11 **Body makes its own nitrite and nitrate**

Recent studies indicate that human body synthesizes both nitrites and nitrates. Cases of bacterial nitrite production in the stomach promoted by abnormally high gastric pH have been observed. In persons with high pH stomachs, more nitrite was formed in the stomach than in the mouth. Another source of nitrite may be synthesis from ammonia and and organic nitrogen compounds in the upper intestine. It now appears that nitrite can be converted back to nitrate in the lower intestine.

Some of the nitrite and nitrate can be absorbed into the bloodstream. Absorbed nitrite is destroyed, but nitrate is recycled through the saliva and becomes available for transformation to nitrite. Nitrite can react with food amines in gastric conditions to form potentially carcinogenic nitrosamines. (Food Products Development. 12(4); 1978; 104)

12 **New generation of non-toxic non-absorbable food additives**

The new generation of food additives are of a large molecular .size that cannot pass through the wall of the human intestine.

The development of non-absorbable food colorants, which are non-toxic and can be formulated to match the important color shades in soft drinks now on the market, was recently announced by Dynapol scientists. These products are known as polydyes and are currently in the second year of a safety testing cycle that may run an additional three years prior to commercialization.

This unique approach was conceived to permit the safe use of colorants in food without the potential risk associated with the long-term ingestion of food additives, which are readily absorbed and eventually come in contact with many organs in the body. The new development will benefit not only the food industry but also the consumer, to whom food products with appealing color qualities and improved safety will continue to be available. Ample experimental evidence is available in support of the conclusions that the polydyes fully satisfy the technical and aesthetic requirements for coloring beverage products. (Food in Canada. 38(6); 1978; 40)

PROCESSES

13 **Defatting of groundnuts and soyabeans**

A simple process for producing defatted groundnuts and soyabeans by using hydraulic-pressing has been developed at the Biochemistry and Food Technology Division of the Bhabha Atomic Research Centre (B.A.R.C).

By this process, 70-80 per cent oil can be extracted with very little changes in the shape of the seeds. The seeds can actually be restored to their original size and shape after oil extraction and converted into ready-to-eat snacks by roasting and puffing.

The process developed on a laboratory scale consists of simple steps: pressing; reconstitution; drying and roasting. Either raw

(with skins), or de-skinned size-graded groundnut kernels, in batches ranging from 100 g to 1 kg are hydraulically pressed for one hour using a perforated aluminium mould and a plunger. After pressing, the seeds, in the form of pressed cake, are disintegrated into distorted seeds in a hammer mill, and collected in wire-mesh trays for further processing.

The trays containing distorted groundnuts are dipped in water containing salt (2 per cent), maintained at 87-90°C for 3-5 minutes. The groundnuts thus reconstituted to original shape are then removed from water. Salt is added only to impart a salty taste. The reconstituted groundnuts are dried to 8-9 per cent moisture in an air dryer at 60°C for 4-5 hours to make them suitable for the roasting operation; this step also gives stability. The dehydrated groundnuts are then subjected to roasting at 90°C for 5-6 minutes to impart palatability. The roasted groundnuts, packed in flexible pouches or metal cans, have been found to be stable for storage upto one year.

The defatted groundnuts and soyabeans have high protein value and increased shelf-life, the latter property being due to a reduction in oil rancidity. Such defatted oilseeds retain their economic value because the bulk of the edible oil in them is recovered before production of the protein-rich meal. (Science Newsletter. 2(1); 1979; 4-5)

14 Application of endo-polygalacturonase to fruits and vegetables

The enzymatic treatment of fruits and vegetables, including two varieties of tomato developed for mechanical harvesting, with endo-polygalacturonase was studied with refrence to condensability, juice yield, viscosity, light transmittance and colour. It was found that enzyme treatment reduced most vegetables to single cells which are suitable for further processing into juices, baby food, dried soups and sauces. Condensability and juice yield of tomatoes bred for mechanical harvesting were significantly improved. In fruit, enzyme treatment was found to increase juice yield, decrease viscosity and increase light transmittance. The colour of fruit juice also became more intense after treatment

with endo-polygalacturonase. (Food Manufacture. 53(8); 1978; 61)

15 Citrus flour - A new fiber, nutrient source

A process that uses a carefully controlled mix of grape-fruit and orange peel, seeds, and pulp residue is blended with sesame flour and milled - producing a fine mesh, pale yellow product with high levels of dietary fiber plus protein and other nutrients.

The citrus flour represents a more complete use of portions of fruit that were formerly processed into cattlefeed, fertilizer, or simply thrown away. Flour made from the residue captures the protein and fiber found in the seeds and peels (10.5 per cent protein with a calculated Protein Efficiency Ratio of 1.7 to 1.8; 13 per cent crude fiber; vitamins C, E, and A, and significant amounts of minerals). It also offers a bland citrusy flavour and pale yellow color.

At a 2½ per cent level, citrus flour doubles the amount of crude fiber found in bread from normal sources. (Food Product Development. 12(7); 1978; 36)

16 Indigenous instant tea

Instant tea samples with an excellent quality of brew have been manufactured for the first time with indigenous technology at a pilot plant at the Tocklai Experimental Station, Jorhat, of the Tea Research Association, Calcutta. In two factories in South India, which use foreign technology, the poor quality of the product has been the main problem in instant tea production. This problem has been successfully overcome in the Tocklai process. The cup quality and aroma of the brews of instant tea samples produced in the Tocklai plant are indistinguishable from the brews of good quality orthodox teas, according to the tea testers. The Tocklai process is based on the upscaled bench process developed at the University of Calcutta under a Tea Board Scheme.

The team of project scientists at Tocklai are now engaged in

The team of project scientists at Tocklai are now engaged in collecting engineering and processing data to finalize a blueprint for commercial production of hot and cold-soluble instant teas for markets at home and abroad. (Industrial News Digest. 1(12); 1978; 8)

17 Powdered booze

All you have to do is add water. Each particle of powder contains a minute droplet of 200 proof pure grain alcohol.

The product itself resembles a gelatin desert powder with one very potent difference. Inside each powder particle, about six microns in size, is a minute droplet of 200 proof pure grain alcohol. Each tiny alcohol spirit is encased in a tasteless shell or coating. The coating material is a mixture of corn syrup, straight grain alcohol, and water. Mixed into a slurry, the alcohol forms the nucleus of the coating and is then dried at temperatures in the spray drying tower which are low enough to prevent the evaporation of alcohol inside the coating.

What results is an odorless white powder with an alcoholic content of approximately 30 per cent by weight with the carrier making up the remaining 70 per cent. (Food Engineering International. 3(7); 1978; 13)

18 Whey protein concentrate

WaPRO 29 is a bland, cream colored, whey protein concentrate processed from sweet dairy whey by reducing the lactose content to approximately 54 per cent and the minerals to approximately 10 per cent and spray drying the concentrate. The protein fraction consists of lactalbumin and beta lactoglobulin. (Processed Prepared Food. 147(8); 1978; 94)

19 Deep fat frying with butter oil

Experiments were made to find out whether the addition of sili-

cone (methylsiloxane) to butter oil improves the chemical and physical stability of butter oil during actual deep fat frying conditions and whether the storage stability of potato chips fried in siloxane-treated butter oil would be increased. The chips were fried on a daily demand basis in butter oil, in butter oil with 10 ppm of silicone and in a corn oil containing silicone. The storage stability was tested by peroxide value. The thermal stability of the oil was determined with the smoke point test, total acid content and non-urea adduct forming esters. Results showed that the addition of silicone to butter oil improved its stability and increased the flavour of the chips and gave higher storage stability. (Food Manufacture. 53(7); 1978; 23)

20 Agglomeration in a fluidised bed

To achieve good dispersion and quick reconstitution, instant food products must consist of very fine particles. This very fine, powdery structure will, however, result in disadvantages which can be overcome by controlled agglomeration. A simple, economic and flexible method consists in remoistening of the dry powder and re-drying, the operations being carried out in a fluidised bed. The equipment designed for the process and the technology used are demonstrated and typical applications, eg. manufacture of cocoa beverages and soup powders, are described. (Food Manufacture. 53(7); 1978; 23)

21 Spray dried honey

Super Bee is a specially prepared, spray dried, honey product with all the characteristics of pure honey. One-half to three-quarters of a pound should be used to replace one pound of liquid honey. The flavor of Super Bee spray dried honey will not bake out in any baked goods, will not crystallize in formulation and has the humectant properties and high heat stability of pure honey. (Processed Prepared Food. 147(8); 1978; 78)

22 Oxygen barrier preserves fish flavor

Fresh frozen fish during long distance shipping develops off-odours and flavours due to the breakdown of fat molecules of fish by oxygen. A process which removes air from the package and heat seals with wrapper of a suitable oxygen barrier film has been developed. Taste panel tests indicated that the conventionally packaged fish had off-flavor three times stronger than vacuum packed fish. (Processed Prepared Food. 147(8); 1978; 55)

23 Invisible continuous pasteurisation

The shelf-life of jar packed jams, which usually curtailed by moulding, can be significantly extended if, after filling and closing the contaminated surface layer of the jam is briefly heated to 70-80°C in a specially designed microwave heating unit. The jars pass through a heating tunnel in which the temperature of the surface layer of the jam is raised by increments to the desired heat. All the jars in a charge, including the first and last rows, are heated uniformly. Since microwaves cannot penetrate metals, the lids of the jars must be made of plastics. The apparatus takes 30 sec. to warm up and is simple to operate. The same pasteurising process may be applied to other foodstuffs packed in glass jars or plastic pots. (Food Manufacture. 53(8); 1978; 61)

24 A new approach to food sterilization

A continuous sterilizer that features total flexibility. The sterilizer's completely new design principle enables packages of a wide range of different can sizes and materials to be processed simultaneously in the same machine. Its main feature is a set of pallet-type carriers, that are introduced in loaded condition and then taken through the machine in a continuous movement by a simple conveying system. Using infeed conveyors, the pallets are loaded with cans and/or other containers. To ease in-sterilizer transport the pallets are mounted on

wheels. Entering through a double-gate, the loaded pallets are carried upward in the sterilizing section via a continuous vertical conveying system. Because the cans or other materials are loaded or pallets, differing sizes of containers that require the same sterilizing time can be processed through the system. (Processed Prepared Food. 147(4); 1978; 77)

BYPRODUCTS AND WASTE UTILIZATION

25 Dried molasses products

The technical capability to dry molasses on a variety of carriers including certain fibres, flours, starches or protein has been indicated. By this a manufacturer can take advantage of the functionality of dried molasses without changing his ingredient statement.

Of particular interest to manufacturers of products with a high dietary fibre content is the Dri-Flo 2000 Series. Dri-Flo 2001, for example, is made up of 75 per cent molasses solids, 15 per cent soya bran and 10 per cent cornflour. For other products, both the types and ratios of the carriers can be changed.

SuCrest's drying technology produces a freeflowing powdered product which retains all the flavour and functional integrity of natural liquid molasses. Moreover, the product remains freeflowing without the use of artificial flow aids such as magnesium stearate, silicon dioxide or tricalcium phosphate. (Food Trade Review. 48(4); 1978; 214)

26 Methane from food wastes

Food wastes from canneries and other fruit and vegetable processors can be successfully converted to methane gas according to stud-

ies by the CSIRO Division of Food Research, North Ryde, NSW. The methane can be burnt to fire boilers. The food waste is broken down into gas by bacteria confined in an airtight tank.

The 4000-litre digesting tank at the Division has been consuming upto 18 kg of orange peel pellets each day and in the process producing 7 m^3 of gas containing 50-55% methane. (Food Technology in Australia. 30(4); 1978; 159)

27 Small-scale extraction and processing of banana fibre

Details are given of the distribution and uses of various members of the banana family. Samples of leaf sheath fibres examined were much coarser than jute and weaker than a low-grade abaca. Percentage extension to break was similar to that of abaca. The fibre is lignocellulosic and it can be dyed with various classes of dye including the reactives. Extraction by hand and with a power-driven raspador is described together with simple methods of spinning, weaving and rope-making. A fine cloth can be made by weaving single fibres, while a coarse cloth suitable for sacking or matting, can be made by weaving the spun fibres. Banana fibres spun with other fibres can be used to form ropes suitable for agricultural purposes. (Tropical Science. 19(4); 1977; 173)

PROCESSED PRODUCTS

28 High protein peanut flour

A new method has been developed for the direct extraction of peanuts to produce a product that can be ground into a bland, white flour with high protein solubility that is desirable for food use.

The procedure currently in use, prepress-solvent extraction, subjects the peanuts to high temperatures which imparts a tan colored

flour and reduce protein solubility, thus decreasing the flour's desirability for some food products. By eliminating high temperatures of cooking and pre-pressing (the pressure runs the temperature up) to remove oil from the peanuts, the solubility of the protein can be kept high.

The new process involves flaking the kernels to 0.010 to 0.007 inch (although thickness did not appear significant), heating to 180°F for 30 minutes at 12 percent moisture, then extracting the oil with hexane for 2 hours at a flake to hexane ratio of 1 to 2. The extracted flakes are desolventized and ground into flour.

The resulting flour is white and tasteless and contains less than 2 percent oil (attempts are made to reduce it to 1 percent). Protein solubility is about 85 percent (as compared with only about 60 percent for prepress-solvent extracted flour).

The flour, which is almost as white as wheat flour, has been used experimentally in bread and biscuit formulations replacing upto 15 percent of the wheat flour with good results and about doubling the protein content. It has also been used experimentally with good results in ice cream as a replacement for upto one-half of the non-fat dry milk solids. A very palatable milk has also been made from the flour with a protein content comparable to cow's milk (about 3 percent) and has about the same keeping qualities. When the milk 'sours' it also forms a curd, much the way cow's milk does. (Agricultural Research. 26(11); 1978; 5)

EQUIPMENT & MACHINERY

Power driven mini salseed decorticator

The power-operated portable mini decorticator consists of a stepped iron roller-type beater (diam. 19 cm, length 14 cm) which rot-

ates in a trough-like grate with spacings and a built-in fan to blow off the lighter matter. The sal fruits are fed from the hopper. The beater with channel grooves on its external surface rotating at 90 rpm, helps rupturing of the fruit by abrasion against the grating. The grate is of semicircular shape formed by arranging a number of mild steel flats with a spacing of 6 mm, placed horizontally on their edges. The fan is mounted on a steel axis, which revolves on a pair of bearings at both ends. The blades of the fan made of iron sheets are bolted to the axis, which is fitted with a pulley of 5 cm diameter on one end and is connected by a V-belt to a bigger pulley of 12 cm diameter of the beater shaft on the same side. The speed of the fan is 900 rpm.

The motor of 1 hp (with a 6 cm pulley) is coupled with counter-shaft drive fitted with ball bearings over the blower fan. This shaft is provided with two driver pulleys of 36 and 10 cm diameter on either side. The motor pulley is coupled with the beater pulley fitted on to the other end of the beater shaft. The fruits fed through the hopper fall into the trough, are beaten by the roller and are thus shelled. The shells and kernels pass through the grating spacings and fall on to an inclined plane from where they are separated by the blower fan. Kernels slide down towards the fan by their weight, whereas the light shells are blown away in the opposite direction. Before arriving at the optimum conditions, several runs were conducted using motors, belts and pulleys of different materials of construction.

The capacity of the unit is 75 kg of sal fruit per hour. The decorticated fraction obtained in a single pass contained 96% kernels and 4% hulls. The degree of decortication was cent per cent. The cost of the decorticator, including the motor, is about Rs.1,500. (The Oils and Oilseeds Journal. 31(1); 1978; 27)

30 Steam peeling machine

A wide range of fruits and vegetables including tomatoes, peaches, apricots, plums, apples, pears, potatoes, celery, carrots,

cucumbers, kohlrabi and paprika can be peeled using the machine.

The machine has a newly developed pressure tank operating in conjunction with an electric sequence control. Venting of the pressure vessel during closing allows pressure ratings to be adapted to the product being peeled. Fruits or vegetables need not be presorted or sized. After cleaning and washing, they are fed directly to the machine by an elevating conveyor. Filling is effected from the top through an opening in the pressure tank. To ensure gentle loading without bruising, the tank is tilted through approximately 45° and the produce slides down. This is particularly important when peeling tomatoes or delicate fruits such as peaches for canning. After filling, the pressure tank returns to an upright position and steam is introduced for peeling at a pre-set pressure. When the peeling cycle is completed - for tomatoes it is less than 8 s-the skins are separated and the peeled products are discharged through the tank opening which is then swivelled through 180°.

A machine with a tank capacity of 1000 litres peels tomatoes at a rate of 9 t/h. (Food Engineering International. 3(7); 1978; 39)

31 Automatic sardine scaling machine

The Sardine Fish Scaling Machine strips scales from sardines without damaging the fish and automatically adjusts to the size of each fish upto 3 ounces (84 g) weight. To assure a high quality finished product, it will not cut the fish or damage the skin. It processes 60 fish per minute by hand and upto 200 per minute with an optional fish feeder.

The machine is constructed with all corrosion resistant materials. Scalers are made of PVC with stainless steel knives, the gears are bronze and all bearings are equipped with Alemite fittings. The unit is mounted on a hot dipped galvanized frame and is powered by three waterproof electric motors each of $\frac{1}{2}$ h.p. (Food in Canada. 38(3); 1978; 47)

32 Equipment for topping carrots

Ungraded, steam or lye-peeled carrots can be topped and tailed at high speeds with an automatic equipment. Depending on size and shape, upto 10 t/h can be processed.

Fed into the machine by a flighted belt elevator and chute, the carrots are separated by a combination of friction and inherent product inertia. They are then transferred by centrifugal force to a knife which cuts one end. This operation is followed by a similar one for the other end. Tops and tails are removed at the bottom, and the processed carrots are ejected sideways.

All contact parts are made of stainless steel and food-grade rubber. Topping adjustment can be varied from 0 to 25 mm during operation. At the end of each production shift, the machine is cleaned in place in about 5 min. (Food Engineering International. 3(6); 1978; 73)

33 Vibratory sifter

The Bench-mounted vibratory sifter is for small and medium sized bakers as well as for applications in the pharmaceutical industry. Flour or other material to be sieved is put into a hopper and the sieved material is collected in containers kept below the sifter. With a 24 mesh sieve, wheat flour is sieved at the rate of 12 kg per minute. Sieves are 35.56 cm square in size. An unskilled person can quickly replace the sieve. It is reported that weevils and other impurities such as jute fibre can be removed from wheat flour only with this type of sifter. Basic eccentric mechanism is provided with three variations of eccentricity to suit the product to be sieved. (Industrial Products Finder. 7(1); 1978; 69)

34 Metal detector conveyor

A metal detector vibratory conveyor that handles wet or dry products and eliminates the dangers of foreign metal parts in continuous

process lines has been designed.

Meant for use in the vegetable processing industry, it is a self-contained unit operating on electricity and compressed air. The detector is magnetic and operates over a glass fibre vibrating pan which has an abrasion resistant gel coating.

The discharge chute actions automatically for product reject whenever metal is detected, without stoppage of the product flow or other process plant. (Food Trade Review. 48(4); 1978; 205).

35 Removes solids from slurries

A new vibrating screen separator is designed to remove a high degree of unwanted solids from crude process liquids and effluents, leaving a comparatively clean liquid which can be further processed or disposed of. Typical applications include brewing, vegetable and fruit processing, and effluent treatment. (Food Manufacture. 53(7); 1978; 73)

36 Color-quality control for food product

Precision color-quality control for a wide range of food produce is possible with these easy to operate and accurate Agtron instruments. Models are available to accommodate powders, purees, pastes and liquids including snack foods, cereals, cookies, crackers, tomatoes and whole fruits. (Food Engineering International. 3(6); 1978; 64)

37 Fruit colour sorter

Designed to remove brown, black or molded berries from a product line, this color sorter has been used successfully by processors of frozen cranberries, blueberries and loganberries. Capacities average 300-400 lb per hour.

In a typical operation, the berries are conveyed from the freezing facilities to the sorter. The berries begin the sorting process in

the hopper, where they are transferred to the rollers. Then, they are inspected by the three-eye scanner. Acceptable berries free-fall into a receiving bin, while damaged or off-color berries are air-jetted to a reject bin. (Food Engineering International. 3(8); 1978; 47)

38 Mixer for wet and viscous material

Sigma mixers are used for viscous and wet material such as heavy pastes, ointments, pigments and putty. Kneading and mixing is done by two overlapping type blades. The blades run at different speeds in opposite directions. Mixer body and blades are made of mild steel or stainless steel to suit requirements. For easy removal of material, hand or motor operated gear system is provided to tilt the body. Five models are available with sizes ranging from 15.24 cm x 15.24 cm to 60.96 cm x 60.96 cm corresponding to working capacities of 2 to 135 kg. (Industrial Products Finder. 7(1); 1978; 125)

39 Machine gives liquids the shake

Universal shaking machine, is for dissolving and dispersion of solids in liquids; extraction of soluble and not-so-soluble solids from insolubles; emulsification of immiscible liquids; as well as for extraction of solutes from one liquid phase into another. It shakes material contained in bottles, flasks or test-tubes continuously and energetically. The shaking plate accommodates bottles or clamped sieves. There is an automatic timer and a rheostat for speed regulation between 80 and 250 strokes per minute. (Industrial Products Finder. 7(1); 1978; 275)

40 Machine for applying flavour mist to chips

An automatic machine enables flavours to be applied to potato chips and snack foods without waste or damage to the chips. Unlike conventional methods which apply flavourings to the product either in dry form or in a slurry, the new system uses an emulsion made of vegetable oil and flavour powder. The emulsion is pumped under pressure

through a series of atomizing heads which create a fine mist and are completely coated.

Mist intensity and hence the amount of flavouring required on the chips is fully controllable. Easy to operate, the machine can handle the output of practically any size of chip and snack fryer used today. The whole system is sealed to avoid waste and contamination of the working environment. (Food Engineering International. 3(7); 1978; 45)

41 Spray nozzle produces fine dispersion of droplets

Combining mechanical and pneumatic spray generation, this industrial-type nozzle produces a very fine dispersion of droplets otherwise available only with laboratory-type units. Spray capacity is 1 to 20 litres/h and droplets size can be varied from 5 to 25 m to meet specific requirements.

Designated type Nx, the unit can easily be retrofitted to existing equipment. It is smaller in size than the previous model and can be supplied in a corrosion-proof version with brass body and stainless steel core. (Food Engineering International. 3(8); 1978; 36)

42 Rice rollers for extra lustre

Castle rice rollers are for use in rice mills for dehusking rice paddies. They have excellent resistance to wear and tear, and give extra lustre to the grain. Blackening of an occasional grain is entirely eliminated. Various sizes and types are available to suit different brands of rice mills. It is said that the rollers have been specially engineered for lightness to reduce the noise factor as well as the wear-and-tear on gears and bearings. Black rollers are not manufactured to avoid the risk of the colour rubbing on the grain. Polyurethane rollers are also available. (Protein Foods and Nutrition Development Association of India, Newsletter No.97; 1978; 7)

43 Conveyor cools candy

Rotex cooling unit is a three-stage, endless conveyor system that uses chilled or cooled air for cooling toffee, sweets and tablets. A specially designed spreader arm spreads the material at about 80°C over the full width of the moving conveyor which is guided to the second stage by the guide plates provided. The material is cooled down to about 50°C in the second stage. The third stage cools it down further to about 25° to 30°C, ready for packaging. Removable glass-fibre trays below the belt collect the finished product and also, separate the stages for the circulating air. Detachable doors on the sides provide isolation and facilitate easy cleaning and maintenance. Adjustable screws at the bottom of every vertical support obviate the need for expensive foundations and compensate for the uneven flooring. All rotating parts are mounted on ball/roller bearings. The capacity is about 6 tonnes of sweets per 8-hour shift. Total power required is 4.5 HP excluding the airconditioning unit. (Industrial Products Finder. 7(1); 1978; 191)

44 Insulated doors to cold stores

A complete line of cold-storage doors includes power and manually operated types, those that slide horizontally or lift vertically, overhead sectional, hinged doors and pass conveyor models for all sorts of applications down to -54°C. Fire doors with 3-hour 'A-label' ratings and special doors are also available.

The lightweight urethane-filled doors are said to provide the best insulation. Horizontal sliding models feature the original angle door track design that assures the tightest door-to-wall fit. Full-perimeter adjustable seals compensate for any uneven wall surfaces. The doors are available in a choice of galvanized steel, stainless steel or tough PVC finishes. (Food Engineering International. 3(7); 1978; 45)

45 Counter current cooling

Conventional cooling system for blanched vegetables prior to

freezing operate at a very high rate of water consumption with consequential effluent output and high charges. To ease the water/effluent problem, and faster cooling to lower temperatures as well, the new machine is known as counter cooler and works on the principle of passing the product through the coolant in the opposite direction to the coolant flow. (Food Processing Industry. 47(558); 1978; 57)

46 Food freezing tunnel for small processor

This is the new 'Mini' Kyrospray food freezing tunnel that has been designed to bring CO_2 freezing and chilling within the economic reach of the small processor. Unique benefits include simple installation, minimum floor space, fast and economical operation, easy cleaning and maintenance, and fast freezing cycles. The Unit will fit into a work area as small as 13 ft x 3½ ft and will freeze upto 400 lb/hr. The freezer's low initial cost and high production capability make it ideally suited for vegetables,fruits, fish, meat, dairy products, bakery goods, speciality foods, fast foods, and precooked restaurant and hospital meals. (Food Engineering International. 3(6); 1978; 89)

47 Pulper with articulated beaters

Higher product yield and improved product quality are the main features of this pulper/refiner of novel design. Unlike conventional systems which use fixed beaters mounted on shafts, the new equipment is fitted with a series of articulated paddles arranged radially on a rotating shaft. When rotating, the shaft produces a centrifugal force, thus slightly pressing the paddles against the product being handled. This is particularly important when processing partially unripe or defective fruits, since it allows optimum squeezing of the ripe parts while expelling the unsuitable parts as waste. Therefore, the flavour of the refined juice is not affected by unripe fruits.

Three models are available with capacities of 7, 15 and 30 t/h. Parts in contract with the product are made of stainless steel and all

models have CIP facilities. (Food Engineering International. 3(6); 1978; 73)

48 Crateless retort

A new crateless retort system automatically sterilizes and cools canned products in any standard size container at process temperatures upto 260°F (126°C). By varying the number of pressure vessels and the length of the transfer and cooling tanks, a variety of production capacities can be obtained. (Food Engineering International. 3(8); 1978; 44)

49 Convection ovens

A new generation of convection ovens for the baking industry features 12-inch thick mineral wool insulation which surrounds the bake chamber; improved heat transfer with the use of convection jets; the ability to control the bake by air flow as well as by temperature; and the optional multi-fuel burners which can use either natural gas, propane or fuel oil.

The Convex II has easy-to-operate linearized, motorized controls for accurately regulating the velocity of air flow directed at the product. These controls operate separately so air velocity above and below the band can be adjusted independently to help assure a completely uniform bake. (Food Engineering International. 3(6); 1978; 89)

50 Fully automated bakery equipment

The new all-in-one fully automatic bakery system can automatically proof, die stamp, fill, bake and depan a wide variety of sweet goods, rolls and better mixed products. Optional equipment for automatically loading, crumbling or topping can also be installed. Pan washing, rinsing, drying and oiling are done automatically as trays are returned to the front of the line. Throughout the process, no tray handling is re-

quired. A central control panel regulates the entire unit.

The multifoods machine features the unique flexibility of allowing bakers to proof and bake a variety of sizes and shapes of dough pieces in one operation. Proofing and baking are done in one pan mounted on a conveyorized carrier. Pans which normally add a sizeable amount to the investment of a new sweet goods line or even a roll line, are included in the purchase price. (Food Engineering International. 3(6); 1978; 81)

51 Pasteurising vats

A new range of heat treatment and pasteurising vats which are fitted with stainless steel steam heating coils instead of the conventional hot water jackets, have been introduced. The limpet coils are designed to operate with steam pressures of upto 15 psi so that higher working temperatures of the products (upto 100°C) can be reached much more quickly with less heat losses. The cooling cycle is also speeded up considerably. An outlet steam trap allows hot condensate to be returned to the boiler feed under pressure.

The new range of vats, which is additional to the water-jacketed models, is available in six standard capacities from 50 to 500 gallons, with special sizes upto 2,000 gallons, to provide for a wide variety of applications, such as dairy products, ice cream mixes, yoghurts for melting, etc. (Food Processing Industry. 47(558); 1978; 71)

52 Food warmer

Lifelong food warmer, is a glass-made printed-circuit appliance which eliminates electrical shocks, fuses or short circuits. It is recommended for keeping food warm in households, hotels, clubs and canteens. Three models are available. Each model can withstand a maximum weight of about 30 kg. The glass on top of the warmer is of about 5.5 mm thickness. Maximum surface temperature is roughly 110°C. The specially toughened glass used is not affected by spilled water or cooking medium,

is non-staining and meant for the dining table. There are no coils, no wiring and no elements inside. Any type of container (except those made of plastics) can be placed on top of the switched-on warmer for as long as necessary. (Industrial Products Finder. 7(1); 1978; 315)

53 Modified evaporator for tomato processing

Converting an existing double-effect evaporator into a triple-effect system has led to considerable savings in tomato processing plant. Output has been increased by 40% without changing water, steam and electric power consumption. (Food Engineering International. 3(7); 1978; 34)

54 Vacuum rotary paddle dryer

The vacuum rotary paddle dryer is for batch-drying of liquids as well as pasty and sandy material. The liquid to be removed can be water or any solvent. The rapid drying action does not damage the product and solvent recovery can be total. The dryer comprises a jacketed cylinder with a hollow shaft which carries the arms with paddles. The jacketed shell, arms and paddles are heated with steam, hot water or hot oil, and cooled with chilled water, brine or other refrigerants. Vacuum pump, dust filter, condensor and receiver are also supplied. At a heating temperature of 100°C, 15 kg of water per hour per m^2 of heating surface can be evaporated. To achieve this drying rate, the entire drying plant requires only about 1.5 kg of steam and 0.12 kWh of electrical energy per kg of evaporated water. The dryer incorporates scraper blades designed to clean the entire heating surface. There is a fine clearance between the paddles and the shell. A breaker bar can be provided to prevent the material from caking and to keep the heat transfer surfaces clear. It is particularly suitable when the product goes through a distinctly sticky phase during drying. A spring-loaded scraper may be supplied in case the product becomes extremely sticky during any stage of drying operation. A specially jacketed cylinder is provided if the heating medium is a

liquic like water or hot oil. The dryer is suitable for dyestuffs, pigments, plastics, plastic additives, agrochemicals, high purity products such as foodstuff and pharmaceuticals as well as organic and inorganic chemical substances. Five models are available with rated capacities of 50C to 6,000 litres. The charge per batch would be 40% of rated capacity. (Industrial Products Finder. 7(1); 1978; 53)

55 Solar drying of chillies

Regional Research Laboratory, Jammu has devised a Solar Drier for drying chillies. Red chillies of Kashmir are very popular, as these impart attractive bright red colour to the dishes. Chillies are produced in substantial quantity in Kashmir valley and it is a common scene to find chillies strung together by thread hung on walls and doors or spread on the rooftops. Commercially the plants with fruits still unplucked are harvested and spread cut on the ground for about a week for partial drying. Thereafter, the fruits are plucked by hand and spread in the field for final drying. The entire operation takes about 15 days during which period chillies are exposed to dirt, dust, fungus attack besides uneven drying.

A solar drier has been made near Pampore which effects completely drying of the commodity in 4-5 days with a marked improvement in colour and storage characteristics. The gadget is very simple and is made of mud, stone, pebbles and glass panes only and is specially suited for the rural areas. It can be conveniently constructed by village artisans. A unit of 2.5 m x 2.5 m size costs Rs.325 and can dry 80 kg of chillies per batch. (RRL (Jammu) Newsletter. 5(5); 1978; 30)

56 Machine for ghee making

A very compact design of the continuous ghee making machine was completed and the trials were conducted successfully. 100 kg of ghee can be produced per hour from creamery butter in this prototype. Steam requirement is less than that in conventional pan method. (NDRI News-

letter. 8(4); 1978; 2)

57 Liquid plastic that resists fungus growth

Steridex, a water based liquid plastic that resists fungus growth, is being used by food plants such as cheese, milk, meat packaging and soft drinks, to combat the formation of mold on walls and ceilings. The plastic has a dirt resistant non-yellowing plastic skin atleast five times as thick as customary paint. (Food In Canada. 38(3); 1978; 56)

58 Flowmeter is versatile

Suitable for any liquid with a minimum conductivity of 1 µs/cm, this magnetic flowmeter can be used for measuring the flow of dairy products, foodstuffs or beverages. There is no pressure drop during metering and the measurement is not affected by temperature, pressure, density, viscosity or conductivity of the process medium. Accuracy is ± 0.5% of full scale.

Available in various sizes with bore diameters from 3 to 150 mm and nominal pressures upto 40 bar, the flowmeter has a standard output signal of 0 to 20 or 4 to 20 mA. The transmitter is of compact design and features low current consumption. It can be mounted in any position and has externally accessible electrodes for ease of replacement. (Food Engineering International. 3(6); 1978; 82)

59 Special switches solve confectionery problem

Special rotary switches to overcome problems arising from the sugar dust during the manufacture of chewing gum have been developed. Conventional switches failed because of sugar contamination of the contacts, but the new switches are fully encapsulated to withstand heavy external contamination. (Food Manufacture. 53(7); 1978; 79)

PACKAGING

60 **Tin-free steel can for processed food**

American Can Company is marketing its first tin-free steel (TFS) two-piece can for the processed food industry. Previously TFS production was limited to three-piece beer and beverage cans, using the Mira Seam process for cementing the side walls.

The new TFS can, in a 404 x 307 size offers several significant advantages over conventional three-piece soldered cans, including overall durability, lighter weight and the potential for lower production costs.

While normal start-up costs of the new production lines may cancel out any short-term cost advantages, over the long run tin-free steel will be a more economical raw material than tinplate or aluminium for making cans for processed foods.

Another advantage of the can is that the double-seamed bottom is eliminated by the two-piece construction, thus allowing for easier stacking in the supermarkets and a minimum of adjustment on the can lines in processing plants.

The TFS used in the process is first coated electrolytically with chrome, in much the same way that tin is deposited on steel to make tinplate. Once the cans have been formed, they are coated on the inside with enamel to prevent any interaction between the metal and the food contents. They are also coated on the outside with a clear lacquer to prevent oxidation of the steel. (Food in Canada. 38(3); 1978; 14)

61 **Vacuum can closer for meat products**

All round rectangular and oval cans may be handled with this vacuum closer, specially designed for the meat industry. Cans between

45- and 150-mm height and 60 to 170 mm diameter can be closed at a rate of 20 to 60/min. Speed is infinitely variable.

A separate clinch station is provided to enable reliable processing of meat products such as corned beef. A lid-embossing station can also be added on request. A similar machine is available for low cost vacuum closing of cans from 45- to 105-mm height and 20- to 135-mm diameter. Maximum capacity of this low cost version is 75 cans/hour. (Food Engineering International. 3(7); 1978; 47)

62 Fills containers at high speeds

A variety of pumpable products such as margarine, lard, ice cream, yoghurt, viscous mixes and flavourings can be filled into containers to an accuracy of ± 0.25% by weight at speeds of upto 110/min with this tub filler. As standard, the machine accommodates ½ and 1 lb, 250- or 500-g containers.

Comprising container-dispenser, filling heads, and lidding mechanism, the machine can be fitted with automatic lid and tub stacking devices, if required. Both the container and lidding units are operated pneumatically and are interlocked with the main drive to the filling head cylinders. This gives a 'no container-no fill' safety feature. (Food Engineering International. 3(8); 1978; 35)

63 Improved carton sealer

This is an improved trigger operated carton sealer. This high grade all-weather poly packaging tape gives immediate adhesion to support full loads and shows significant savings over reinforced gummed tape and offers the same operational effectiveness and equal performance. The trigger dispenser allows minimal strips to be applied that will make the package stronger, will not cut it or scratch other packages. The tapes have all-weather properties. When applied to dry surfaces, they will withstand extremes of cold, heat and humidity. (Food in Canada. 38(3); 1978; 15)

64 Migration limits set for plastics

Proposals put forward by the EEC Commission last month set definite overall migration limits for plastics in contact with foodstuffs. They aim at making sure that by May 29, 1980 no plastics will impart more than 60 mg per kilo to foodstuffs.

Because of the difficulties involved in analysing migration levels in food products the Commission has chosen to propose conventional tests with liquids capable of simulating the attack of foodstuffs and reproducing the migration phenomena. It allows the loophole that if tests are found not to be sufficiently representative of reality, the individual governments may provisionally amend them until a community-level decision is taken.

The proposal will cover materials and articles consisting exclusively of a single type or a mixture of plastics, or comprising two or more layers of materials of which the inner layer is of plastics. Specifically excluded are regenerated cellulose film elastomer materials and also natural and synthetic rubbers; surface coatings like varnishes, lacquers and dispersions (applied as liquids, but not as melts) adhesives; and paper and paperboard impregnated with plastic materials.

The basic limits of migration are set at either 60 mg a kilo or litre, depending on whether the product is a liquid or solid. However, the value is set at 10 mg/dm^2 of the surface in contact with the foodstuff for containers of less than 250 ml capacity or of sheets, foils and other non-fillable articles for which the ratio of surface area and quantity of foodstuffs in contact cannot be calculated, (Packaging News. July 1978; 3)

65 Plastic crate cleaner

A plastic crate and case washing machine has been developed by ultrasonic cleaning. It works on the ultrasonic principle: objects to be cleaned are totally immersed in a hot detergent and submitted to ultrasonic vibratory energy, which removes surface soil including the

tenacious grey film commonly referred to as static soiling. The machine is fabricated from steel, thermally insulated with expanded polystyrene and clad with painted mild steel or GRP panels in dark blue. Although designed to clean plastics, the machine has proved itself in laboratory testing to clean various metal containers to a previously unobtainable degree in about one-sixth of the normal time. Handles crates up to 475 x 375 x 280 mm in size at a rate of up to 1,500/h. (Food Manufacture. 53(7); 1978; 75)

ANALYSIS

66 Determination of hairs and feathers in cereal products

A rapid combined method for hydrolysis and staining, using only one reaction vessel for the determination of hairs, feathers, insects and similar detritus in cereal products, is described. Problems associated with the selection of a distinctive staining agent are discussed, and the choice of remazol brilliant blue is explained with reference to the modified keratin confirmatory test applied to starch containing products. The mechanism of this test is explained, and experimental results are evaluated. (Food Manufacture. 53(8); 1978; 61)

67 Kit for microbial contamination

A disposable dip-test device permits personnel without microbiological training to determine the level of microbial contamination in products and ingredients. These kits give easy and quick results equal in accuracy to those of conventional pour plating.

Basic kit includes samplers and complete dilution kit. For testing solids, an additional filtration system provides means to sterilize suspension medium and suspend sample in one operation. (Food Product Development. 12(4); 1978; 82)

68 Electronic measurement of bacterial growth

Currently practised procedure of dilution and growing in medium for assessing the population of bacteria is tedious and time-consuming (lasting several days), and owing to poor reliability, the analysis must be carried out on several replicates to get sufficient accuracy.

An improved and accurate method, based on the previous electrical impedance method (bacterial sensitivity $10^3/mm^3$), with a sensitivity to detect 1 bacterial division/mm^3 and a simultaneous batch processing capacity of two samples has been worked out at the University of Aberdeen and Torry Research Station, Aberdeen (U.K). The method provides a reliable measurement of bacterial population. In particular, two instruments have been devised: one measures ac-conductance changes in 4-5 sample directly on a chart recorder and the other can handle up to 128 samples at a time and feeds the data to a digital computer for processing to obtain bacteriological parameters like mean generation time, lag time, inoculum number, etc. from conductivity measurements. Another advantage is that the sample cell is so designed that it needs no replacement, as in the case of earlier methods. The sensitivity of detection of bacterial growth has been found to be 50 mm^{-3}. This is considerably more than a 5% sensitivity possible in the viable counting method. (Journal of Scientific and Industrial Research. 37(10); 1978; 562)

69 Grain-quality analyzer

This grain-quality analyzer permits direct protein calibration of wheat from just two samples. Benefits include the elimination of particle-size as a critical factor to accurate results, protein readings and calibrations independent of growing area, and the sampling of 'wet' or 'dry' samples without influencing computations. (Food Engineering International. 3(6); 1978; 86)

70 Determination of starch content in meat products

A semi-automatic enzymatic determination of the starch content in

meat products has been worked out. The procedure entails the measurement of the glucose content of a perchloric acid hydrolysate of the sample. The glucose determination in the hydrolysate can be done enzymatically via oxidation of the glucose catalysed by glucose hydrogenase using the NAD^+ coenzyme mixture. Neutralization of the hydrolytic acid, the addition of a protein precipitating agent and intermediate dilution of the hydrolysate can be dispensed with this new method. The technique provides simple, rapid and specific determination of glucose and the operation can be easily automated. (Food Manufacture. 53(7); 1978; 23)

71 Refractometer for juice products

A refractometer for juice products is said to eliminate the need for water baths, thermometers and to reduce human error. The unit ~~requ~~ requires no correction tables to read or scales to interpret and it has temperature compensation, which allows for various room temperature and sampling of hot or cold products. (Processed Prepared Food. 147(8); 1978; 116)

72 Nitrite test controls curing process

The Rapid Nitrite Analyzer, used with a modification of the standard AOAC colorimetric method, brings nitrite determination to the production floor as a process control tool. By accelerating established diazo-coupling reactions, it is made possible for the quantitation of nitrite in pickle solutions in less than 15 minutes and meat products in 1½ hours.

Personnel with minimal experience can measure nitrite with accuracy of ±1 per cent. A sample is weighed, diluted to standard volume, and mixed with color-developing reagents. At a specified time, color intensity is measured by the Analyzer, then equivalent ppm of nitrite is read from a chart. (Food Product Development. 12(2); 1978; 24)

ECONOMIC & COMMERCIAL STATISTICS

73 Availability of foodgrains in India

(Thousand tonnes unless otherwise stated)

Year	Population (Thousand persons)	Production		Net imports	Net availability	Per capita net availability	
		Gross	Net			Kg per year	Gm per day
			Rice				
1976	6,13,273	48,740	45,036	79	42,228	68.8	188.0
1977(P)	6,25,818	42,788	39,536	(-)17	39,537	63.2	173.2
			Wheat				
1976	6,13,273	28,846	25,356	5,832	23,779	38.8	106.0
1977(P)	6,25,818	29,082	25,563	411	26,824	42.9	117.5
			Other Cereals (Other than rice and wheat)				
1976	6,13,273	30,409	24,104	529	24,302	39.6	108.2
1977(P)	6,25,818	28,492	22,718	...	23,321	37.2	101.9
			Cereals				
1976	6,13,273	1,07,995	94,496	6,440	90,309	147.2	402.2
1977(P)	6,25,818	1,00,362	87,817	394	89,682	143.3	392.6
			Gram				
1976	6,13,273	5,879	4,581	(-)2	4,579	7.5	20.5
1977(P)	6,25,818	5,366	4,180	(-)1	4,179	6.7	18.4
			Pulses				
1976	6,13,273	13,039	11,409	(-)5	11,404	18.6	50.8
1977(P)	6,25,818	11,208	9,807	(-)1	9,806	15.7	43.0
			Foodgrains				
1976	6,13,273	1,21,034	1,05,905	6,435	1,01,713	165.8	453.0
1977(P)	6,25,818	1,11,570	97,624	393	99,488	159.0	435.6

(P)-Provisional and subject to revision.

1 kg. per year = 2.74 grams per day.

NOTES.-1. Population figures are based on the latest projections made by the Expert Committee.

2. Net production has been taken as 87.5 per cent of gross production in respect of cereals and pulses; the percentages used in respect of rice, wheat and gram are 92.4, 87.9 and 77.9 respectively, balance being provided for feed, seed requirements and wastage.

3. Figures relating to net imports have been arrived at by deducting gross imports.

4. The estimate of net availability are calculated as: Net production + net imports - (±) change in government stocks.

5. Figures in respect of per capita availability given above are not strictly representative of the actual level of consumption in the country, especially as they do not take into account any change in stocks in possession of traders, producers and consumers.

(Agricultural Situation in India. 33(3); 1978; 183)

74 Groundnut production in India

All-India Final Estimates of Groundnut, 1977-78

State	Area (thousand hectares)	Production (thousand tonnes)
Andhra Pradesh	1,066.0	974.7
Bihar	8.7	8.2
Gujarat	1,954.2	1,723.1
Haryana	8.1	9.6
Himachal Pradesh	1.8	1.9
Karnataka	944.0	648.9
Kerala	26.7	28.0
Madhya Pradesh	509.4	290.7
Maharashtra	848.3	578.4
Orissa	104.0	117.3
Punjab	156.0	154.0
Rajasthan	243.5	174.1
Tamil Nadu	975.0	1,110.5

(contd...

Tripura	0.4	0.4
Uttar Pradesh	326.3	244.7
All India	7,174.8	6,068.5

(The Oils and Oilseeds Journal. 31(1); 1978; 41)

75 Safflower production in India

All-India Final Estimate of Safflower, 1977-78

State	Area (thousand hectares)	Production (thousand tonnes)
Andhra Pradesh	20.1	5.0
Bihar	0.5*	0.2*
Karnataka	163.3	38.0
Madhya Pradesh	0.8	0.2
Maharashtra	515.0	142.2
Orissa	1.5*	0.7*
All India	701.2	186.3

*- Last year's data repeated for want of information for 1977-78

NOTES:

1. Safflower is not grown to any appreciable extent in other States/Union Territorics not mentioned above.
2. No information regarding crop estimates is yet available from the Government of Sikkim.

(The Oils and Oilseeds Journal. 31(1); 1978; 40)

76 Production of Nigerseed in India

All India Final Estimate of Nigerseed, 1977-78

State	Area (thousand hectares)	Production (thousand tonnes)
Andhra Pradesh	12.9	11.7
Bihar	52.6	20.7
Karnataka	45.1	8.4
Madhya Pradesh	261.0	46.7
Maharashtra	107.7	12.9
Orissa	110.3	39.1
Dadra & Nagar Haveli	0.4	0.1
All-India	590.0	139.6

NOTES:

1. Nigerseed crop is not grown to any appreciable extent in other States and Union Territories not mentioned above.
2. No information regarding crop estimates is yet available from the Government of Sikkim.

(The Oils and Oilseeds Journal. 31(1); 1978; 40)

77 Production of Sesamum in India

All India Final Estimate of Sesamum (Til or Gingelly), 1977-78

State	Area (thousand hectares)	Production (thousand tonnes)
Andhra Pradesh	149.0	25.9*
Assam	10.9	5.3
Bihar	21.0	5.1
Gujarat	110.1	23.3*
Haryana	3.4	1.8
Himachal Pradesh	8.2+	2.0+
Jammu and Kashmir	5.3+	1.1+
Karnataka	99.0	38.3*

(contd...

Kerala	16.3	4.3
Madhya Pradesh‡	262.7	45.5*
Maharashtra	175.1	44.2
Manipur	2.3+	1.1+
Meghalaya	0.5	0.3
Nagaland	0.7	0.3
Orissa	145.0	60.8
Punjab	13.1	11.4
Rajasthan	363.1	50.1*
Tamil Nadu	118.9	39.2
Tripura	2.6+	0.8+
Uttar Pradesh	-	-
Pure	57.2	7.9*
Mixed	707.0	95.6
Total	764.2	103.5
West Bengal	33.4+	21.4+
Pondicherry	0.7	0.3
All-India	2,305.5	486.0

* Based on the results of crop estimation surveys.

+ Last year's data repeated.

‡ Includes area of 900 hectares and Production figure of 200 tons for 1977-78 and 1976-77 for the crop grown in non-reporting (forest) areas of Madhya Pradesh.

NOTES:

1. Sesamum is not grown to any appreciable extent in other States/Union Territories not mentioned above.
2. No information regarding crop estimates is yet available from the Government of Sikkim.

(The Oils and Oilseeds Journal. 31(1); 1978; 42)

78 Cashew production

State-wise area and production of cashew in India* in 1976-77

State	Area (hectares)	Production (tons)
Andhra Pradesh	25,100***	12,500
Kerala	1,18,139	1,29,021
Karnataka	36,534	15,175
Maharashtra	79,808**	3,634
Orissa	24,487*	940
Tamil Nadu	97,130	11,470
Goa	32,517*	6,500*
Pondicherry	322	42
Tripura	753*	23
West Bengal	2,506*	Neg
T o t a l:	4,17,296	1,79,305

*Earlier year's figures are repeated.

**Including an area of 49,961 hectares brought under cashew under Land Development-cum-Horticulture Development Scheme.

***Indicates bearing area only. Total area has been called for. After getting this, area estimates will have to be revised upwards.

NOTE: Area and production figures are as reported by the State Governments. They are purely tentative and provisional and liable to be revised.

(Cashew Newsteller. 12(1-3); 1978; 25)

79 Area and Production of Black Pepper

State/District	Area (Hectares)	Production (Tonnes)
Karnataka		
Belgaum	5	1
Chickmagalur	55	6
Hassan	34	4
Uttara Kannada	896	229
Shimoga	215	65
Dakshina Kannada	490	121
Kodagu	1,804	559
Other Districts	-	-
T o t a l:	3,499	985
Kerala		
Trivandrum	5,856	1,780
Quilon	9,628	3,456
Alleppey	5,231	999
Kottayam	12,938	2,199
Ernakulam	6,304	1,652
Trichur	1,678	458
Palghat	851	225
Malappuram	6,049	1,748
Kozhikode	19,658	7,922
Cannanore	32,081	8,983
Idikki	9,882	1,354
T o t a l:	1,10,156	30,776
Tamil Nadu		
The Nilgiris	200	40
Kanniya Kumari	80	20
Other Districts	-	-
T o t a l:	280	60
Pondicherry	12	4

- Nil or Negligible

Note: The crop is not grown to any appreciable extent in States/Territories/Districts not mentioned above.

(Agricultural Situation in India. 33(3); 1978; 190)

80 Poultry production in India

Poultry production in the country has made a substantial progress during the recent past. The annual production during 1977-78 touched 10,000 million eggs as against 7,700 million eggs during 1973-74. The target for 1982-83 is 16,000 million eggs.

Scientific poultry breeding programmes were intensified last year at the three Central Poultry Breeding Farms located at Hessarghatta (Bangalore), Bombay and Bhubaneshwar. A cross hybrid strain has been developed at Hessarghatta Farm, which has the potential to lay upto 260 eggs in 12 months production period. The laying performance of this hybrid compares favourably with the hybrid has been released to the industry under the brand name HH 260. (Economic and Commercial News. 7(49); 1978; 12)

81 Augmenting milk production

The tentative target proposed for milk production during the sixth plan is 35.5 million tonnes as against the estimated production of 27.8 million tonnes in 1977-78. The achievements of the operation Flood-I Programme have been reviewed to ensure effective implementation of Operation Flood II Project, whose implementation has been taken in hand.

The achievement of the Operation Flood-I Programme so far are: (i) increase of the milk processing capacities in the dairies of metropolitan cities of Bombay, Calcutta, Delhi and Madras to 2.5 million litres of milk per day as against the target of 2.75 million litres daily. Throughput of milk in these dairies having increased to 1.9 million litres per day as against 0.9 million litres in the pre-project period; (ii) 17 feeder balancing dairy plants in rural areas on Anand pattern have been established or expanded; (iii) over 900,000 milk producers have been enrolled as members of milk cooperative societies. Further 7,000 cooperative societies have been registered on Anand pattern; (iv) over 2,500 artificial insemination sub-centres have been established

and over 1.1 million insemination have been carried out; and (iv) 14 bull mother-farms have been established in the project areas for production of genetic materials for the cross-breeding programmes. The total expenditure under the project has been Rs.698.30 million. (Economic and Commercial News. 7(52); 1978; 12)

82 Expenditure on science and technology

India spent Rs.4,480 million in 1976-77 on research and development (R&D). Atomic energy research accounted for 23% of the total expenditure followed by defence research (21%). The shares of other sectors were: Council of Scientific and Industrial Research (17%), Space Research (16%), Agricultural Research (15%) and Medical Research and Electronics (2%). (Data India. 52; 1978; 827)

83 Production of edible oils and oilcakes in India

(in lakh tonnes)

Year	Oils	Oilcakes
1976-77	23.60	32.41
1977-78	24.50	N.A.

(The Oils and Oilseeds Journal. 31(1); 1978; 42)

84 Production of vanaspati in India

Year	Quantity (tonnes)
1977	5,80,000
1978 (Estimated)	6,50,000

(The Oils and Oilseeds Journal. 31(1); 1978; 42)

85 Sugar production and consumption

The actual domestic consumption of sugar reached 4.49 million tonnes level, registering an increase of nearly 20 percent, over the previous year's consumption of only around 3,753 million tonnes.

The capacity utilisation in the sugar industry ranged from about 89 to 116 percent during the last six seasons, which compared favourably with the general industrial scene in the country. (Economic and Commercial News. 7(50); 1978; 11)

86 Exports and imports of oilseeds and oils

Commodity	April to March 1977	
	Quantity (thousand tonnes)	Value (Rs in Lakhs)
EXPORTS		
Oilseeds		
H.P.S. groundnut kernel	122.81	5,939.54
H.P.S. groundnut with shell	413.73	584.61
Niger seed	9.44	246.69
Safflower seed	2.55	38.54
Sesamum seed	4.46	185.28
Vegetable oils		
Groundnut oil	3.40	196.51
Mustard oil	0.08	4.46
Linseed oil	42.09	1,843.91
Castor oil	40.96	2,202.40
Coconut oil	0.01	0.34
IMPORTS		
Copra	5.08	157.37
Linseed	4.73	105.02
Mustard seed	3.06	65.02
Sesamum seed	0.03	0.92
Oils		
Soyabean oil	87.95	5,115.78
Groundnut oil	18.30	2,010.94
Linseed oil	6.63	37.15
Mustard oil	22.29	1,109.44
Palm oil	39.97	1,744.71
Coconut oil	0.15	9.71

(Agricultural Situation in India. 33(3); 1978; 177)

87 Export and import of cashew kernels from India

Period of ending	Export of kernels Quantity (tons)	Value (Rs Lakhs)	Import of rawnuts Quantity (tons)	Value (Rs Lakhs)
1975-76	53,640	9,613	1,37,196	3,356
1976-77	51,565	10,599	74,131	1,808
1977-78*	39,111	14,761	60,194	1,872

*Provisional

(Cashew Newsteller. 12(1-3); 1978; 23)

88 ECGC's new schemes for exporters

The Export Credit and Guarantee Corporation Limited (ECGC) has introduced the following three schemes for the benefit of exporters. (1) Investment insurance guarantee; (2) special scheme for small scale exporters; and (3) whole turnover post-shipment export credit guarantee.

The salient features of the investment guarantee scheme are:

i) All companies and individuals carrying on business in India and their overseas subsidiaries are in principle eligible for insurance. The basic principle is that the investment should be Indian in the host country and benefit shall accrue to India.

ii) Investment in any country approved for the purpose is eligible for investment insurance subject to prior clearance.

iii) Investment may be made by way of equity or loans granted to overseas enterprises by the investor or his associates. It may be made by either as cash remittance or by way of export of capital goods or services. The Corporation may at its discretion cover investment/loans already made/ extended on a selective basis. If increased investment

is out of the retained profits/interest, cover will be available subject to an investment not being more than 50 percent of amount, originally invested.

iv) Cover shall extend to 100 percent of the value of investment for the first 10 years and shall be reduced thereafter year by year till the 15th year when the cover shall extend to 50 percent of the value of the investment. The maximum amount of insurance will be 150 percent of the original investment inclusive of profits plus dividends and/or interest and fresh equity.

v) The duration of insurance cover shall not normally exceed 15 years. In case of projects involving a long period of construction, cover could be considered in deserving cases for a period of 15 years from the date of completion of the project subject to a maximum of 20 years from the date of commencement of the investment.

vi) Risks of war, expropriation, restriction or remittances and such other risks as may be considered necessary, with the approval of the Government will be covered. The commercial risks of the investment are not covered.

vii) The percentage of cover is based on the principle of risk sharing. In the case of total loss of the investment from the occurrence of any insured risks, ECGC will cover 90 percent of the loss of the current equity investment. Current equity briefly means the original investment less any redemption or reduction of capital plus any retained profits less any commercial losses and loans. It shall be open for the Corporation to restrict the percentage of cover at the time of annual renewal of the guarantee.

viii) The insurance premium will be at the rate of 1 percent per annum which is payable in advance for each year. In addition, a fee of 0.1 percent of the amount to be insured subject to a maximum of Rs.25,000/- is to be paid along with each application, which is adjusted towards the insurance

premium payable when the Corporation agrees to cover the investment.

ix) In case the application for investment is rejected, 50 percent of the fee paid shall be refunded.

As regards special schemes for small scale exporters, the following will be the concessions:

i) It is proposed to restrict the scheme to an exporter whose annual export turnover including letters of credit transactions is not more than Rs.1 million and his total turnover including export does not exceed Rs.2.5 million.

ii) The following agencies who may exceed the aforesaid prescribed financial limits would be treated on par with small scale exporters:

(a) Co-operatives or artisans,

(b) Co-operatives or association or consortia of small scale industries,

(c) Handloom and Handicrafts export promotion or State export Corporations,

(d) State small scale industries corporation, and

(e) NSIC.

iii) Insurance policies: The cover will be 95 percent for commercial risks and 100 percent for political risks provided the maximum liability under the policy does not exceed Rs.0.5 million special cases, relaxation would be considered.

iv) Packing credit guarantee: The cover will be extended to 90 percent for small scale exporters whether manufacturers or merchant exporters.

v) Several other concessions have been laid down for processing claims of small scale exporters even in the event of their failure to fulfil certain basic obligations under the policy, provided the Corporation is satisfied about the bonafides of the transactions.

vi) Furthermore, the process of settlement of claims will be

expedited in case of small scale exporters. Transfer claims would be paid within 2 months instead of the usual period of four months.

The main features of the whole turnover post-shipment export credit guarantee are as under:

i) The guarantee can be issued to banks whether exporters holds ECCC policy or not.

ii) The cover would be 85 percent in case of exporters holding ECGC policy and 60 percent in case of exporters who do not hold ECGC policy.

iii) The cover would be 90 percent and 65 percent for small scale exporters who hold ECGC policy and who do not hold ECGC policy respectively.

iv) The banks will be permitted to fix limits upto a certain amount on each exporter and beyond that limit they have to seek ECGC's approval.

v) Banks have option to cover L/C advances. If they opt for L/C advances, they have to cover all L/C's.

vi) The rate of premium will be 2.5 paise per Rs.100/- per month payable in case banks not opt to cover only non-L/C advances and 2.0 paise per Rs.100 per month in case all post-shipment advances including L/C's covered. Declarations will be submitted as under whole turnover packing credit guarantee.

vii) Banks can alter the terms of the bill and extend the due date in their discretion and according to their best judgement upto 180 days. If the period is to be extended beyond 180 days prior approval of ECGC would be necessary.

(Economic and Commercial News. 7(45); 1978; 7-8)

89 Mandatory air freight rates for spices

The Government of India, Ministry of Tourism and Civil Aviation

have issued notification dated 13th November 1978 advising the Air India to apply a mandatory rate of Rs.6.30 per kg for air freighting shipments of foodstuffs, spices and beverages from Delhi/Bombay for various specific destinations provided the weight of each shipment is 250 kg or above. The destinations are Dubai, Muscat, Abu Dhabi, Kuwait, Baghdad, Bahrain, Jeddah, Dhahran and Doha. (Cardamom. 10(6); 1978; 46)

FOOD LEGISLATION, QUALITY CONTROL AND HYGIENE

Acrylonitrile banned from beverage containers

Food Technology reports that in the USA acrylonitrile copolymers will no longer be allowed in the manufacture of beverage containers because residual acrylonitrile monomer migrates from the bottle well into the contents of the bottle at levels that are not considered safe. The FLA has stated that a safe level of human consumption cannot be determined because of the inadequacy of the data available and the probable carcinogenicity of acrylonitrile. Details are in the Federal Register of 23 September 1977. (Food Technology in Australia. 30(4); 1978; 131)

91 ### Red No.40 still under study

A second interim report on the coloring agent Red No.40 has been tabled by a special Working Group of the U.S. Food and Drug Administration. The report indicates that current available data does not show this coloring agent to be carcinogenic. However, it was also recommended that final assessment of the coloring should not be made until a second mouse study begun in 1976 and still underway is completed. (Food in Canada. 38(6); 1978; 12)

92 Cardiovascular studies in rapeseed and mustard seed oil eating population

Mustard and rapeseed oils are consumed in large quantities in Bengal and Bihar. These oils are rich in erucic acid. A study was undertaken to find out the potential danger of development of heart fibrosis due to erucic acid in population accustomed to consume the above oils.

The heart samples examined showed erucic acid from 1 to 10% in population eating the above oils. But there was no histological evidence of development of fibrosis ascribable to the consumption of mustard oil. In great majority of hearts about 5% erucic acid was noted. The results of these studies may therefore be taken as indicating that at levels of intake of mustard oil generally seen in population groups the risk of developing myocardial fibrosis is low. (ICMR Bulletin. 8(2); 1978; 7-8)

93 Data bank on viruses in food

The WHO Food Virology Programme maintains a data bank on viruses in foods and the effect of food-borne viruses on public health. Reports in the collection concern:

(a) Properties of viruses that affect their transmissibility;
(b) instances of virus occurrence in foods, as evidenced by laboratory detection of the virus or by an outbreak of human disease;
(c) other evidence of virus occurrence in foods;
(d) methods of detecting food-borne viruses; and
(e) studies of virus stability or inactivation in foods.

Each report is based on one or more sources of information (usually journal articles) from all over the world and has been prepared by a laboratory virologist.

The retrieval system provides precise information on specific subjects and it is aimed to serve food control authorities, epidemiologists dealing with food-borne disease outbreaks, research and laboratory workers in the field of food hygiene, and research programme

planners. In order that information may be given as promptly and precisely as possible, users of the system will be supplied with 'Request for Information' forms which direct questions in a way that is compatible with the retrieval system. These forms and additional information on the programme may be obtained from Veterinary Public Health, Division of Communicable Diseases, World Health Organization, 1211 Geneva 27, Switzerland. (Institute of Food Science & Technology (U.K) Proceedings. 11(1); 1978; 61)

94 Directory of testing facilities

The Indian National Scientific Documentation Centre (INSDOC), New Delhi, has taken up the compilation of a 'Directory of Testing Facilities in India' under the National Information System for Science and Technology (NISSAT) scheme of the Department of Science and Technology. The Directory will cover facilities relating to the testing of agricultural and food products, chemicals, drugs and pharmaceuticals, instruments and appliances, materials, physical and engineering metrology, testiles, electrical engineering, electronics, etc. Institutions and organizations which have such facilities, even if meant for in-house use only, may send particulars in this regard in conformity with the questionnaire designed for the purpose. Copies of the questionnaire may be obtained, on request, from the Scientist-in-Charge, INSDOC, Hillside Road, New Delhi-110 012. (Research and Industry. 23(2); 1978; 116)

95 Spicy foods cure bronchitis

Tobasco sauce and horseradish may do wonders for bronchitis. Spicy foods are particularly good for helping clear up respiratory problems. In Los Angeles, the Mexican members of the population who go in for hot spice food have far less bronchitis than the non-Mexicans who do not tend to eat such food. Oysters served with horseradish or spiced shrimp or dishes laced with tobasco sauce or highly seasoned gumbo clear sinuses, nose, and may help to clear lungs. Bronchitis

sufferers can sprinkle 20 drops of tobasco sauce into a glass of water and use it as a gargle. (Science Reporter. 15(11); 1978 767)

96 Detergent/disinfectant is for food industries

Developed for use in food and beverage processing plants. Weladyne-FB is an iodophor combining the disinfectant action of iodine with the wetting and cleaning properties of synthetic, non-ionic surface-active agents and phosphoric acid. In many applications, its combined action enables both cleaning and disinfection to be achieved in one operation.

The product is available in 5- and 25- liter containers. It can be used for treating processing equipment, food preparation areas such as table tops, food storage coldrooms and refrigerated transport units. (Food Engineering International. 3(8); 1978; 36)

TRANSFER OF TECHNOLOGY AND NEW INDUSTRIES

97 US know-how for oilseed processing units

The Co-operative League of the US (CLUSA) will assist co-operative oilseeds processing units in India in improving their management and technological efficiency. This assistance will be made available through the services of three consultants to be located with the National Co-operative Development Corporation (NCDC).

The collaborating agencies have drawn up a detailed project for development and testing of modern management techniques, technological efficiency and training programme including preparation of manual of materials for the oilseed processing units as well as organising a number of workshops and seminars for plant managers.

CLUSA experts in management and oilseed technology will work in the processing plants for introducing new management systems to improve their efficiency. NCDC will also employ three counterpart consultants so that after the management consultants leave, they can carry on with the consultancy.

CLUSA will provide an assistance of $4,75,000 (about Rs.38 lakhs) for this project which will last two years. NCDC has, so far, given financial assistance amounting to Rs.200 million for setting up 40 large-sized co-operative oilseed processing complexes comprising oil mills, solvent extraction plants, refineries and vanaspati units all over the country.

The processing units are based on a variety of raw materials including groundnut and cottonseed. Many units are in the initial stages of operation and it is envisaged that their all-round efficiency will improve substantially through the technical and management assistance being provided under this project. (The Oils and Oilseeds Journal. 31(1); 1978; 38)

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